Noise pollution from oil and gas development may harm human health

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By Ann Brody Guy, PSE Healthy Energy

Modern oil and gas development techniques such as directional drilling and hydraulic fracturing, or “fracking,” produce noise at levels that may increase the risk of adverse effects on human health, including sleep disturbance, cardiovascular disease and other conditions that are negatively impacted by stress, according to a study by authors at the nonprofit science and policy research institute PSE Healthy Energy and West Virginia University. It is the first peer-reviewed study to analyze the potential public health impacts of ambient noise related to fracking operations.

“People living near oil and gas development may bring up concerns like air pollution, traffic and groundwater safety, but many also complain about noise,” said Jake Hays, director of the Environmental Health Program at PSE Healthy Energy, and lead author of the paper, which was published December 9 in Science of the Total Environment. “But until now, most of the research relevant to public health has focused on the impacts of air and water pollution,” Hays said.

Fracking technologies have unlocked oil and gas deposits from formations like shale and tight sands that previously were not considered economically viable. But the environmental and public health effects of such operations are still emerging. To understand whether noise from fracking might impact the health of surrounding communities, PSE Healthy Energy researchers gathered all available data and measurements of noise levels at oil and gas operations and compared the information to established health-based standards from the World Health Organization and other groups.

They found that noise from fracking operations may contribute to adverse health outcomes in three categories:

Annoyance: Sustained noise may produce a host of negative responses such as feelings of anger, anxiety, helplessness, distraction, and exhaustion, and may predict future psychological distress.

Sleep Disturbance: Awakening and changes in sleep state have after-effects that include drowsiness, cognitive impairment and long-term chronic sleep disturbance.

Cardiovascular Health: Studies have found positive correlations between chronic noise exposure and elevated blood pressure, hypertension and heart disease.

Environmental noise is a well-documented public health hazard. Numerous large-scale epidemiological studies have linked noise to adverse health outcomes including diabetes, depression, birth complications and cognitive impairment in children. Noise exposure, like other health threats, may disproportionately impact vulnerable populations such as children, the elderly and people with chronic illnesses.

High-decibel sounds are not the only culprits; low-level sustained noises can disturb sleep and concentration and cause stress.

“Oil and gas operations produce a complex symphony of noise types, including intermittent and continuous sounds and varying intensities,” said PSE Healthy Energy Executive Director Seth Shonkoff, who is also a visiting scholar at UC Berkeley Department of Environmental Science, Policy and Management and an affiliate of the Lawrence Berkeley National Laboratory. For example, compressor stations produce a low rumble; drilling a horizontal well is a loud process that can take four to five weeks 24 hours per day to complete; and using large volumes of water at high pressure results in pump- and fluid-handling noise.

Compound or synergistic effects also may be at play, Shonkoff said. For example, noise reduction technology may lower negative impacts, and synergistic effects of noise and air pollution may create a new health threat or amplify an existing one.

Researchers note that data collection methodologies varied across public and private entities and types of drilling operations, requiring some estimates in the data. They say additional research is needed to determine the level of risk to communities living near oil and gas operations.

However, initial evidence suggests that policies and mitigation techniques are warranted to limit human exposure to unsafe noise levels from fracking. Policies can specify setbacks from residents and communities – in particular vulnerable populations such as schools and hospitals – noise mitigation techniques such as perimeter sound walls, and location siting decisions that make use of natural noise barriers like hills and trees.

Michael McCawley McCawley WVU, the interim chair of the Occupational and Environmental Health Department at West Virginia University, was also a coauthor on the study, titled “Public health implications of environmental noise associated with unconventional oil and gas development.”

Physicians, Scientists and Engineers for Healthy Energy is a nonprofit research institute dedicated to supplying evidence-based scientific and technical information on the public health, environmental and climate dimensions of energy production and use.

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